THE JOURNAL OF PHILOSOPHY

PSYCHOLOGY

AND

SCIENTIFIC METHODS

MAR 2 1918
UNIV. OF MICH. LIBRARY

VOL. XV. NO. 5: FEBRUARY 28, 1918

CONTENTS

On the Distinction between Primary and Secondary Qualities: THEODORE DE LAGUNA 113

Concerning the Nature of Philosophy: D. W. PRALL 127

Societies:

New York Branch of the American Psychological Association: A. T. POFFENBERGER 130

Reviews and Abstracts of Literature:

Pintner's and Paterson's A Scale of Performance Tests: F. L. WELLS 134

Durant's Philosophy and the Social Problem: WILLIAM KELLEY WRIGHT 137

Journals and New Books 138

Notes and News 140

PUBLISHED FORTNIGHTLY

THE JOURNAL OF PHILOSOPHY
PSYCHOLOGY AND SCIENTIFIC METHODS

All communications to the Editors should be addressed to PROFESSOR FREDERICK J. E. WOODBRIDGE, or Professor WENDELL T. BUSH, Columbia University, New York City.

Subscriptions and advertisements should be sent to THE JOURNAL OF PHILOSOPHY, Sub-Station 84, New York City. The annual subscription price (twenty-six numbers) is $3.00 and the charge for single numbers is 15 cents. Advertising rates will be forwarded on application.

The Journal of Philosophy, Psychology, and Scientific Methods is owned and published by Frederick J. E. Woodbridge and Wendell T. Bush, at Lancaster, Pa.

Entered as second class matter, January 19, 1904, at the Post Office at Lancaster, Pa., under Act of Congress of March 3, 1879.

PHILOSOPHICAL, EDUCATIONAL, AND SCIENTIFIC BOOKS

JUST PUBLISHED

The Ethics of Euripides

By RHYS CARPENTER

50 cents net

A study of the fundamental assumptions of Greek ethical thought from an analysis of the extant plays of Euripides. Right conduct is shown to be identical with submission to Nature and much of Aristotle's ethical teaching to be contained by implication in Euripides.

ARCHIVES OF PHILOSOPHY, No. 7

Columbia University Press **NEW YORK CITY**

ROSMINI'S CONTRIBUTION TO ETHICAL PHILOSOPHY

By JOHN FAVATA BRUNO

Archives of Philosophy, No. 6
Columbia University Press
New York City

Religious Values and Intellectual Consistency

By EDWARD HARTMAN REISNER

75 cents net.

Archives of Philosophy, No.
Columbia University Press
New York City

Advertisements of new books will be inserted on this page for $1 an issue or $15 a year

VOL. XV, No. 5. FEBRUARY 28, 1918

THE JOURNAL OF PHILOSOPHY
PSYCHOLOGY AND SCIENTIFIC METHODS

ON THE DISTINCTION BETWEEN PRIMARY AND SECONDARY QUALITIES

SINCE Protagoras discovered that when half of a taut string vibrates it gives a note an octave higher than that of the whole string, physical science has had as one of its great ends the "reduction of secondary to primary qualities." This end has been quite as strongly evidenced by the unsuccessful as by the successful attempts to further it—by the programmes of the Cartesian or Hobbesian physics as by the highly developed mechanical theory of heat. Or consider the programme of the ancient atomists, the more striking because of its utter hopelessness. The atomists were uncompromising dogmatists as to what science had to do, and thoroughgoing skeptics as to its ability to do it. All the qualities of things must be reduced to the size, shape, arrangement, and mode of motion of the atoms, and all causality must be reduced to the communication of motion by impact. But as to how this reduction was in any case to be effected, only plausible suggestions were possible. Hence a system magnificent in its general outlines and paltry in its details. But the ideal end stands out the more clearly.

Among the opponents of this movement, Aristotle is typical and, from the magnitude of his influence, easily chief. The general *motifs* of the opposition are simple. When a quality is reduced to quantitative terms—when, for example, an harmonic interval is reduced to an arithmetical ratio—what becomes of the quality? It remains. The so-called reduction affects it not at all. An harmonic interval is not a ratio, and a ratio is not an harmonic interval. Similarly, sweetness and sourness are not roundness and sharpness, but distinctive qualities; and so likewise of the colors, *etc.* Let it be conceded that no qualitative change takes place without motion. That does not resolve it into motion. When a blue garment fades, an enormous number and variety of motions no doubt occur; but neither this fact nor any other can replace the fact that the garment was blue and now is gray.

Simple and obvious as these considerations are, their influence

upon physical inquiry has been most unfortunate. The Aristotelian theory of the kinds of matter is again typical. There are four kinds of matter in the sub-lunar world, characterized by the qualities, warm and cold, wet and dry. Fire is primarily warm, and also dry; air wet and also warm; water cold and also wet; earth dry and also cold. Such were the terms in which physical phenomena were to be explained, and beyond which explanation could not go. The result was seen in the rapid development of a smug dogmatism, which made effectual investigation impossible.

The failure of the atomists to reach any trustworthy results, and the confessed tentativeness of the mathematical theory of the elements expounded in Plato's *Timaeus*, may be urged as an excuse for the Aristotelian scheme. If excuses are needed, such a one is doubtless as good as another. But while both types of theory were equally futile at the time, the future belonged to the mathematicians. This was true in later pre-Christian centuries. It was made more evident in the rise of the modern physical sciences.

What fallacy is there in the Aristotelian view? Only a missing of the real point at issue, and a misconception of the strength of the opposition. It is not that the reduced qualities are declared to be unreal—though there are philosophers who have said this—or that in being reduced they are analyzed into quantitative terms—though this also has been asserted. The vital contention is that the qualities in question are, directly or indirectly, relative to the physiology of animal, or specifically human, perception, and hence must not be admitted into an explanatory account of the mutual behavior of bodies in general, for which perception by men or other animals is an irrelevant contingency.

In physical science colors are indispensable descriptive elements. Thus it is a convenient circumstance that one form of phosphorus is yellow and another red, the former being poisonous while the latter is not. In the use of phosphorus the color is an ever-present and thoroughly trustworthy guide. But no one suggests that the color is in any degree responsible for the effect on the alimentary canal. Similarly, vinegar and dilute sulphuric acid both taste sour, and both redden blue litmus paper; but no one attributes this effect to the sour taste.

The distinction between primary and secondary qualities is thus a real and exceedingly important one. And yet for the last two hundred years English philosophy has, for the most part, given it scant recognition or has even denied it altogether. This state of affairs is, I believe, in the main traceable to the critical reaction carried through by Berkeley against the "common-sense" theory of the distinction set forth by Locke.

Locke, it will be remembered, held, in the first place, that the ideas of things are (psychologically) composed of the ideas of their qualities *plus* a certain vague idea of a substratum or possessor of the qualities; and that the ideas of qualities, if complex, are resolvable into simple ideas, derived—in the case of external objects—from sensation. The simple ideas of sensation are derived, for the most part, from one or another single sense: colors from sight alone, tones from hearing alone, solidity (or impenetrability) from touch alone, *etc.* But there are exceptions. The ideas of size, shape, motion, and rest are derived both from touch and from sight. These exceptional ideas, together with the idea of solidity, are further remarkable in that they resemble the qualities themselves as they exist in the external objects, while in the case of the rest no such resemblance exists. This, then, is the distinction between primary and secondary qualities.

In appreciating the significance of Berkeley's famous criticism, it is as important to observe the extent to which Locke's theories are retained as to note the various points of divergence.

1. Berkeley accepts the theory that the ideas of things are compounded of the ideas of their perceived qualities, rejecting only the idea of the material substance which Locke conceived to be necessary to underlie and hold together the qualities. This general agreement is the more remarkable, because the distinction between logical and psychological analysis is due, more than to any one else, to Berkeley himself.

2. He condemns the distinction between ideas derived from one and those derived from two senses. No idea is common to two sense-departments. Visual size, shape, motion, and rest have nothing in common with the tactual ideas denoted by the same names. The two sets of ideas are so closely and so uniformly conjoined in our experience, that they have become almost indissolubly associated together: we "see" how a thing feels, and "feel" how it looks. But the elementary ideas are absolutely disparate.

3. He holds that there is no more reason for supposing that the ideas of the so-called primary qualities resemble the objective qualities themselves, than for supposing this of the ideas of the so-called secondary qualities. *If* beyond and distinct from our ideas there are things which are not ideas, but active, substantial entities, it is impossible that our ideas should in any way resemble them.

If there were ideas common to two senses, it might have been maintained that these, at least (leaving aside the idea of solidity), are peculiar. For ideas belonging to a single sense might be thought relative to the peculiar psychological conditions of that sense; whereas ideas common to two senses, so different in other respects

as sight and touch, must be free from any such degree of relativity, and thus may well represent the things as they are. However, there are no such ideas.

4. But Berkeley further declares that the distinction between things and ideas of things is itself nugatory—except, indeed, as it may be interpreted as a distinction between two classes of ideas: namely, ideas of sensation (or sensations) and ideas of imagination (or images). The former class are distinguished by comparatively great intensity and steadiness, as well as by certain uniformities observable in their succession (the "laws of nature"), and by their inaccessibility to the direct control of volition. The latter are comparatively weak ideas, more flitting, more irregular, and subject in some degree to voluntary control.

5. Consistently with the foregoing principles, the qualities of things are to be regarded as nothing but relatively simple sensations into which the things are found to be analyzable; and the like is true of the "ideas" (more properly, the images) of the qualities. Neither primary nor secondary qualities belong to "things in themselves," if this is intended to mean things otherwise than as we perceive them. But as a matter of fact things exist as we perceive them, and only as we perceive them. To be perceived is, for them, existence. Hence if the formal distinction between primary and secondary qualities is to be retained, all qualities must be set down as primary: there are no secondary qualities.[1]

As a refutation of Locke, Berkeley's theory is all that is to be desired; and as such it was as nearly as possible successful. Locke remained the master of those who had common sense; but in the domain of philosophy he became a point of departure rather than a guide.

Berkeley's weakness lay in those presuppositions of his philosophy which he inherited from Locke, and which with his keener and bolder thought he developed to consequences that baffle credence. Among these presuppositions is the *assumed identity of the qualities of sensation and the secondary qualities of things*—an important case of a larger confusion between sensation and perception, which, in its generality, it will not be necessary for us to include in this discussion.

[1] It may be interesting to recall that Berkeley proposed to base upon these principles a reform of geometry and mechanics, by which those sciences would be greatly simplified. The point of departure of the reform was to be the rejection of the mathematical point and the substitution for it of the *minimum sensibile* of touch. Since the point can not be perceived or imagined, we really have no idea of it—only a word which adds nothing to our understanding of anything. Accordingly, the infinite divisibility of the straight line disappears; motion becomes discrete; and the infinitesimal calculus is exploded.

Let us consider a few simple illustrations.

(i) I buy a bottle of vanilla extract, and then protest to the grocer that the extract is worthless, being entirely without odor. He notices that the cork has not been pulled, and asks how I expect to smell the odor with the bottle corked. I say that that circumstance is irrelevant: that an odor to exist must be perceived, and, therefore, the alleged odor, being unperceived, does not exist.

The cork is pulled; and I now find the odor very weak. The grocer objects that I have a cold and hence am not a competent judge. I reply that the odor is as I perceive it, and I perceive it as weak; therefore, it is weak. And I insist upon the return of my money.

(ii) I refuse to purchase a violin (warranted to have an exquisite tone) on the ground that it has no tone at all. Nobody is touching it.

(iii) I order paper of a certain standard red shade. When it comes I declare that it is off-color. The daylight, as it happens, is golden with the autumn leaves; but that does not prevent me from rejecting the paper as defective.

In all this I am acting contrary to common sense. But am I not acting in strict accord with the identification of the olfactory, auditory, and visual sensation-qualities with the secondary qualities of odor, tone, and color?

Let us recall how Berkeley deals with such cases—for, indeed, he was not so stupid as to overlook them or to fail to make some provision for them in his theory. We may imagine him replying somewhat as follows:

The ideas of sensation are connected by those uniformities which we call the "laws of nature." The sensations which one at any time experiences are thus, in so far as he is acquainted with the laws of nature, evidence to him of the fact (or the possibility) that he is about to perceive certain other sensations; and they are, moreover, evidence that under like conditions similar sensations will be felt by his fellow men. Accordingly, we are able, in our use of language, to use a single term, not for a single sensation, but for a whole group or series of sensations. We speak of "*the* vanilla" as if that were an identical object whether the bottle is corked or uncorked. We speak of "*the* odor" of the vanilla as if that were one object; whereas what actually is perceived is a variety of sensations, very similar in quality, to be sure, but differing greatly in intensity. Nay more, even when no such sensation is actually perceived—at any rate in any human experience—we continue to make present assertions about "the odor," as if that were something that endured whether perceived or not. Such assertions, however, are elliptical. What one expresses is merely the conclusion of a conditional proposition,

which is true as a whole, though the condition is contrary to fact. "This extract has the characteristic vanilla odor," asserted when the bottle is tightly corked, is a condensed form of the proposition, that *if* certain conditions, now absent, *were* present, I, or another like me, *would* experience a certain sensation. Similarly the proposition, "The earth revolves about the sun," means that *if* we were placed in such or such a position, and certain other requisite circumstances were given, we should see the earth moving in that way; and this may be fairly deduced from actual observations, by well-established laws of nature.[2]

Now when a man buys vanilla of a certain guaranteed strength, he is far from desiring that he shall thereafter at all times perceive a certain olfactory sensation of a certain intensity. What he desires is the establishment of conditions under which he can, when he pleases, experience such a sensation in a desired intensity. The prospective purchaser of a violin does not wish to hear incessantly all the notes which the instrument is capable of producing. The experimenter with colored papers would be altogether baffled if the perceived colors did not vary in characteristic ways according to the illumination. Because of our foresight, acquired through our observation of the laws of nature, we are interested not only in actual sensations, but also in the possibility of their occurrence. But, when all is said, the actual sensations exist, while the possible sensations do not exist.

The issue, I think we may say, is fairly and squarely met. But certain comments suggest themselves.

1. Suppose we accept outright the doctrine that the permanent thing, as distinguished from the passing complex of sensations, is a fiction, a manner of speaking. Nevertheless, fiction though it be, it is not to be lightly confounded with the sensation-complex. When Berkeley says that an *apple* is a "collection" of "a certain taste, smell, figure, and consistence," that have been "observed to go together,"[3] he clearly contradicts his own principles. For according to his principles the word "apple" denotes, not any particular actual sensation-complex, but a whole system of possibilities—a fiction.

This may be said to be a question of words. It is so; but it is not, therefore, unimportant. The consistent use of words is an important condition of consistent thinking. Accordingly, we are not surprised to find Berkeley's greatest disciple, J. S. Mill, in a celebrated passage,[4] correcting Berkeley's language and declaring the

[2] *Cf.* Berkeley's *Principles of Human Knowledge*, § 58.

[3] *Principles of Human Knowledge*, § 1.

[4] Chapter XI. of his *Examination of Hamilton.*

"material thing" to be a group of permanent possibilities of sensation.

2. In this connection we should bear in mind Mill's further criticism of Berkeley—apparently less well known than it should be, for the phenomenalists of to-day show no sign of having paid the slightest attention to it. Berkeley was distinctly in the wrong, says Mill, in holding that the laws of nature—at any rate, any laws of nature with which we are acquainted—are uniformities in the order of our sensations. And in this negative assertion Mill was undoubtedly right. With a few interesting exceptions (such as the phenomena of difference-tones), we are never able to say: "If I experience such and such sensations, I shall then, or thereafter, experience such and such other sensations." The determining conditions of our sensations always involve far more than our simultaneous or previous sensations. We have not even any reason, apart from a highly speculative theory, for supposing that all the previous sensations of all animate beings put together are a sufficient ground for a single new sensation. Accordingly, Mill held that the uniformities which we call the laws of nature obtain, not between sensations, but between things and events—that is, according to his theory, between groups of possibilities of sensation and the changes that take place in them.[5]

With this modification of Berkeley's system, the question of the relation between primary and secondary qualities passes into a new phase. The old argument, that the difference between these qualities is nugatory since they are alike qualities of things that exist only as they are perceived, falls to the ground. They are qualities of things, which may indeed be fictions, but which are conceived as existing independently of the actual sensations of any one.

But, with this new understanding of the matter, we find the distinction between primary and secondary qualities still obliterated. Both are regarded as possibilities of sensation. To be green, to be sweet, to be straight, or to be a foot long is equally to afford characteristically different sensations under different determining conditions.

[5] While the plain truth of Mill's statement, that the laws of nature, as we know them, do not describe the order of our actual sensations, has not been denied by any one who has seriously considered it, we sometimes find it argued that these laws must ideally be *reducible* to such a form, and, indeed, ultimately to the form of uniformities in the order of the sensations of each separate individual that is capable of knowing them. The reason alleged is the psychological one, that (as it is affirmed) the only direct observation upon which we could found a knowledge of an "external" world is that of the order of our sensations. The point is of no importance for the purposes of the present study; but it is now pretty generally recognized that this alleged reason is of extremely doubtful weight. *Cf.* G. A. de Laguna, *Sensation and Perception:* II, *The Analytical Relation,* in this JOURNAL, Vol. XIII., pp. 617 ff.

Will this account hold? I believe that we may say that it does hold for the secondary qualities, but that it is not wholly accurate and is far from sufficient in its application to the primary qualities.

1. That the secondary qualities are not single sensation-qualities, but groups, or systems, of possibilities of sensation, appears clearly from the kind of test that we apply in determining whether two things have the *same* quality.[6] For this purpose it is not sufficient to have received the same sensation from the two things. In matching colors, for example, it is not a sufficient proof of identity that they be indistinguishable under some one condition of illumination. The thread and the cloth that match in the rear of the store, do not *really* match (we say) unless they continue to do so when they are carried to the front. The colored papers that seem alike in a golden light are not really alike unless they equally seem so by white light. The strands of wool that are all "red" to the color-blind observer, or to the indirect vision of the normal observer, are not red unless they are so to normal direct vision.

With these facts in view, the suggestion has often been made, that a "real" likeness means likeness under a certain standard condition and for a standard observer; and it has been explained that the standard condition means either the most frequent or otherwise the most important condition; while, similarly, the standard observer means the man whose perceptions agree with those of the vast majority. But the fatal difficulties in this view have been as often urged. What is the standard illumination? The light must be white, of course; but of what strength? A good match at one intensity of illumination (at twilight) may be a noticeably poor match at another intensity (at noon). Moreover, an observer possessed of an unusually delicate color-discrimination, who saw differences of hue where the vast majority of men saw none, would not be set down as a poor observer. On the contrary, he would be credited with perceiving real differences that had escaped most other men.

The perfect color-match is a match that holds for every observer under every condition of illumination. The reason that some illuminations and some observers are tolerably good standards is that any match which holds for them will in all probability hold for any illumination and any observer that is likely to be found. Colors that are the same by daylight will, in general, be the same by lamplight; colors that are the same at noon will be the same at twilight; colors that are the same for normal direct vision will be the same for color-

[6] This method of approach is familiar to mathematicians. When they see no direct way of defining a function, they often announce, instead of a definition, the condition under which this function remains the same for two different values of its variable. *Cf.* L. Couturat, *Les Principes des Mathématiques*, pp. 42 ff.

blind vision—but not *vice versa*. As we say, we *see colors better* in the light than in the dark.

Similarly of the other sense-departments. Two locomotive whistles may seem to give very different notes when one is approaching and the other is receding; but the notes may really be the same. They are so if they seem the same when the locomotives are both approaching or both receding at the same speed. Wintergreen and peppermint lozenges that taste alike when one has a cold, do not taste alike under every other condition; hence they do not taste alike *simpliciter*. In general terms, to have the same secondary quality means to afford like sensations under every condition to which the two things are subjected.

Accordingly, a secondary quality may be defined as a capacity for affording sensations belonging to a certain sense department, the sensations themselves varying in quality or intensity with the varying external or physiological conditions.

In appreciating the significance of this definition, we must refrain from certain questions, which from our present standpoint are clearly impertinent. We must not ask, for example, whether a capacity to do something does not always rest upon some constant structure, and whether the "real" color, taste, *etc.*, of the object must not, therefore, be some such structure. For all this matters not at all. The secondary quality, as we conceive it, and as, on the basis of our observation, we attribute it to things is a capacity, or potentiality. In order to believe that blood is red, it is not necessary to have any theory as to the structural basis in the object, of the various color-sensations by which the redness may be perceived. In order to attribute sweetness to sugar, it is not necessary to have any theory as to the structural peculiarity in sugar that makes it taste sweet; and, indeed, in this case it is notorious that no generally acceptable theory has been proposed—yet our conception of sweetness is not the less clear for that. Let redness and sweetness have what basis they will, or none at all. Let them, together with the things to which they belong, be fictions. It remains true, that, as predicates in our common judgments, they are, in Mill's phrase, possibilities of sensation.

2. How far can a similar account be given of the primary qualities?

On a first examination, it may seem that an almost precisely similar account must be given. A length of an inch is a determinate possibility of sensations, namely, such sensations as those by which, under various conditions, we perceive that a thing is an inch long. Straightness, roundness, squareness are permanent possibilities of

the sensations which we experience when we perceive that things are straight or round or square.

The former test of identity remains applicable. For two objects to have the same size or shape, it is not sufficient that in a single observation they seem the same. That may happen, and yet one may be a hundred times larger than the other, and very different in form. The identity must hold for any and every observation, under any identical condition to which they may be subjected.

It may, indeed, be fairly objected, that the primary qualities are distinguished by the important part played in their perception by symmetry and rhythm—characteristics not of the sensations themselves individually, but of "colligations" of sensations. In this respect they are analogous to the musical intervals, which are perceived independently of the absolute pitch of the notes. It may also be urged that the primary qualities are possibilities of sensation of more than one kind: vision and "touch," at least. This last, however, may be a less radical difference than we commonly suppose. In most perception of extension and figure, kinesthetic sensations are principally involved, the alterations of color and pressure serving as guides for the movements by which the kinesthetic sensations arise. There is, to be sure, a perception of extension and figure by the unmoved skin, as there is also by the unmoved eye; and such perception, it seems, may enter in varying degrees into the total perception when the skin or the eye is actually moved. But it is markedly inferior, and it is quite possibly derivative from former experiences of movement. Kinesthetic sensations also enter largely into the perception of temporal intervals. From our present knowledge it would be too much to lay down the general proposition, that primary qualities are potentialities of kinesthetic sensation; but such a theory would not be manifestly false.

3. If the primary and secondary qualities are so far alike, what essential difference is there between them?

When the qualities of things are spoken of as possibilities of sensation, it must not be forgotten that this possibility, like every other, is relative—relative, that is to say, to the further contingent conditions which are necessary to make the sensations actual. Among the necessary conditions is the physiological organization of the senses of the possible observer. Equally essential conditions are the spatial and dynamical relations between the thing and the observer. As these relations change, the sensations change in quality, intensity, or both. Moreover, these relations are in this manner determinate conditions not only of the sensations of one department, but of the sensations of all departments.

For this reason the description of the primary qualities as possi-

bilities of sensation is insufficient. It fails to take account of the fact that in the determination of sensations the primary qualities have a double significance: first, as the potentiality of the sensations by which the primary qualities are themselves perceived, and, secondly, as determining conditions of all sensations whatsoever.

4. The primary qualities of things are connected together by the body of uniformities which constitute the sciences of geometry and mechanics. Not only are the spatial and dynamical relations of bodies to the perceiving organism important as determining the actual sensations experienced; but the spatial and dynamical characteristics of bodies constitute a vast system within which mutual determinations of the highest degree of specificity obtain.

In contrast to this, let it be observed, not only is there no known determinate order in the succession of our sensations (as Mill pointed out), but there is no known uniformity in the succession of secondary qualities in any thing or in any combination of things. With respect to the simultaneous occurrence of secondary qualities, there are some known laws; for example, what is very hot is painful to the touch, or, what is very dark is not deeply colored. But, though secondary qualities enter freely into laws of the succession of phenomena, they never stand alone there. Things of various kinds, taken in the concrete, or primary qualities of things must enter also. For example, we may say that what is hot warms what is cold—if the warmth is not intercepted by some intervening body.

5. Geometry and mechanics have their basis in the act of measurement, of which the case of linear measurement (measurement of lengths and distances) is typical.

The judgment of lengths takes place in various ways. One thing may by a direct comparison be seen or felt to be longer than another; and the greater length may accordingly be regarded as the possibility of the characteristically different sensations experienced in perceiving it. But there is one mode of judgment which is of prime importance, because upon it the system of geometry directly rests: measurement. This consists essentially (as I have elsewhere remarked[7]) in determining whether one or both of the bodies that are compared can, or can not, be brought into simultaneous contact with two others—generally, in practise, two parts or ends of a single solid, which may be called the measuring-standard. If one of the compared bodies is capable of this, and the other is not, the former is the longer. If neither can, by reference to any discoverable standard, or by any indirect method based ultimately on measurement, be shown to be the longer, they are presumed to be of the same

[7] In "The Nature of Primary Qualities," *Philosophical Review*, Vol. XXII., pp. 506 ff.

length. The length of an object, from this point of view, is thus not a quality which it possesses in direct relation to a perceiving organism. It is a property which consists in mutual relations of objects, with only an indirect reference to possibilities of sensation.

In performing the experiment or series of experiments which measurement requires, it is important that the standard employed shall not perceptibly change in size or shape. Otherwise the results may be far from trustworthy. But, given these conditions, it is found that the results of measurement are remarkably uniform. It is then, in general, found that if measurement by one standard shows A to be longer than B, no other standard shows B to be longer than A.

There are, however, exceptions. Even when no relevant change in the standard has been observed, it sometimes happens that an earlier measurement shows one of two objects to be the longer while a later measurement shows the other to be the longer. When this occurs we preserve our scale of lengths by supposing that an actual change has nevertheless occurred, either in the standard or in one of the compared objects. Which has been affected we leave to further measurement to determine.

In this way we conceive of a scale of permanent lengths which are, at any moment, independent of the possibility of perception. Strictly speaking, the existence of these lengths is not demonstrated; for the same ground on which we do not permit the scale to be destroyed by any single contrary observation, prevents us from establishing it. If unperceived changes have occurred when our measurements disagree, may they not have occurred when the measurements agree? Nay more; as we become sophisticated, and realize that our standards do change in various known ways and may well be changing in many unknown ways, the scale of lengths is still undisturbed. Though no single experience can bear evidence for or against it, the whole course of our experience bears ample testimony to it; for where no change in length is perceived in objects under investigation, our measurements with or upon them reveal, in general, only slight or slow changes.

6. Thus lengths, and with them the whole system of concepts of metrical geometry, acquire the characteristics which, in both ancient and modern times, have so fascinated the most logical and the most mystical of thinkers—not always distinct sets of men. Lengths, as thus conceived, are so far from being relative to the physiology of human or animal perception, that they can not be perceived. They have, indeed, a new relativity: they are relative to each other. A foot is twelve inches, and it is one third of a yard; while an inch is one twelfth of a foot, and a yard is three feet. But the old rela-

tivity is no more. The lengths that change not, though all standards of measurement change, are obviously independent of our perceptive faculties. They have the eternal self-subsistence of the Platonic idea.

Meanwhile, as possibilities of sensation, the lengths are far from having the new relativity. A foot, to the eye or the hand, is a pretty definite thing. One rarely runs any risk of confusing it with an inch or a yard. It is as different from them as red is from green, or middle *C* from the *G* above it—shading into them by indefinable gradations, but perfectly distinct none the less.

It remains true that the conception of the eternal and self-subsistent length has its origin in lengths as possibilities of sensation, and it has its utility in its relation to such lengths. As Plato said of his ideas, we may say of the ideal lengths: though never adequately represented by any perceptible thing, they are very suggestively "imitated." Grant that the length of a standard platinum rule is in all probability constantly changing, even though the temperature be kept constant. Not only are all such changes imperceptible, but, treating the rule as if it had a constant length, we find in our results no inconsistencies that can not be charged to the clumsiness of our manipulation. The ideal length is always independent of the actual particular bar of platinum. If it were not, there would be no sense in saying that the bar's length varied with the temperature. But the ideal length owes its place in our science to the function which it performs as an instrument of our analysis of phenomena. By describing the changed behavior of the bar of platinum, when the temperature has been allowed to vary, as a transition from one length to another—the lengths themselves being unchangeable and, indeed, eternal—we bring simplicity and consistency into our world-view.

7. Lengths have thus a double character; and I believe that the reader will agree with me that the like can be shown of the other primary qualities of things. On the one hand, they are possibilities of sensation; on the other hand, they are a system of ideal magnitudes, determined only by their relations to one another.

A modification of the ordinary terminology is thus suggested, which I believe would be very advantageous. Instead of distinguishing between lengths, *etc.*, and colors, *etc.*, as primary and secondary qualities, it would be well to recognize that there is both a primary and a secondary quality of length; and similarly of volume, shape, position, duration, motion, mass, force, *etc.* A mass, for example—say that of a tennis-racket—is a potentiality of sensations. One can learn to recognize it pretty accurately. But masses are also, as Poincaré pointed out, "*coefficients it is convenient to introduce into*

our calculations."[8] His mistake was in supposing that this double nature was peculiar to the special concepts of mechanics and did not equally belong to those which mechanics shares with geometry.

The two orders of lengths, like the two orders of masses, remain intimately correlated. The geometrical length, being free from relativity to our modes of perception, is conceived as the length of the object as it is in itself, and hence as the actual underlying basis of the secondary length, as a mere potentiality of sensations. The physical mass of the tennis-racket is conceived as the basis of the mass as it reveals itself in the sensations we experience in wielding the racket. In general terms, the primary qualities are conceived as actual conditions of determinate possibilities of sensation, the corresponding secondary qualities being these possibilities as such.

We are at once reminded of a question which we previously dismissed as irrelevant: whether the secondary qualities commonly so-called have not their actual objective bases. It is, of course, generally recognized that they have. Colors and tones, warmth and cold are referred to definite physical conditions; and though these are largely unknown in the case of tastes and smells, we do not hesitate to assume their existence. May we not, then, recognize primary as well as secondary qualities of redness, acuteness, warmth, and sweetness?

I think that we may. But if such a revision of our terminology were carried through, we should have to guard against the suppression of another important distinction.

Whether or not physics and chemistry are ultimately reducible to mechanics, all physical and chemical *measurements* are in mechanical terms. The objective colors, tones, *etc.*, are measurable only in terms of the primary qualities, commonly so-called. In part the physical bases of the perceived qualities are unknown to us. In part they are at present unmeasurable. But in so far as they are measurable, the above statement holds. The objective color we specify by wave-length, refractive index, *etc.;* the objective pitch by frequency of vibration; the objective temperature by the volume of a fluid, etc. To this extent the objective conditions of the perceived colors, tones, and temperatures merge with those of perceived figures and forces; and the old primary qualities remain in a special sense primary after all.

8. A word may be added (although I have already written on the subject in this JOURNAL[9]) with reference to the working-assumption which we have made: that things, their secondary qualities, and *a fortiori* their primary qualities are fictions. As I view the

[8] *Science and Hypothesis,* Halstead tr., p. 76.

[9] Vol. XII., pp. 453–5.

matter, such assumptions are not to be regarded with the utmost seriousness. The empirical demonstration of what is or is not given in experience is notoriously difficult. It may even be impossible. Perhaps the very distinction between the given and the inferred or constructed is not altogether valid. What appears as fact and what appears as fiction in our theories, depends upon what is originally assumed as datum. In the above discussion, the sensations were taken over from Berkeley as the primary data of our construction; and, for my part, I do not know that any other choice of a starting-point would have been better. What we may hope to be of real significance in such arguments is the interrelation of concepts that is developed, an interrelation which may reappear, with altered perspective and with necessary modifications of detail, in more adequate constructions. There is no claim to be made for the precise order of the development.

THEODORE DE LAGUNA

BRYN MAWR COLLEGE.

CONCERNING THE NATURE OF PHILOSOPHY

THE following paragraphs offer the suggestion that philosophy is simply science itself as distinguished from the sciences; and this suggestion is made with reference to the objection so regularly brought against "self-psychology," that the latter is a philosophical inquiry instead of a scientific one. In other words, I suggest that all scientific inquiry, when it proceeds carefully enough and examines its beginnings, necessarily turns into philosophy. This statement hardly differs from that of one of the accepted views of philosophy, *i. e.*, that philosophy examines the presuppositions and the implications of the particular sciences with a view to harmonizing them in a comprehensive whole of knowledge. My idea is, however, rather the obverse of this view; at least I begin differently. My point is that philosophy is identical with science itself, and that the more definite and accurate and rigorous one attempts to be in studying science, the more surely will one be studying not only philosophically, but philosophy itself. The very naming of science as such indicates a belief in a single world of facts falling under a single set of laws. How there could possibly be anything in the realm of thought beyond science as thus defined, I can not conceive.

The sort of thing, for example, that *is* suggested as beyond science is the Kantian doctrine of the transcendental ego. But how does Kant discover this ego? How does he discover any unity, transcendental or empirical? Obviously, it seems to me, by thinking. And to think is to turn one's attention to facts and to attempt to organize and arrange those facts so that they may be conceivable

together. Kant appears to find his way back out of phenomena to what must underlie phenomena—to categories. But what are these, so far as they *are* at all, but the facts of Kant's own mind as discovered by that mind? Try as he may, Kant can be more than empirical only in that he turns from more easily observed and more obvious phenomena to the very complex phenomena of his own organizing intelligence. In other words, he definitely follows the method of science; he observes and experiments with "inner" or even "transcendental" facts. And if Kant's Transcendental Unity *is* at all, then it is part of science, empirically discovered.

The differentiæ of science and philosophy are not of the sort that most idealists appear to acknowledge. Philosophy, if it is more or other than science (not than the particular sciences), is purely fanciful and unscientific, precisely what it always objects to being called. But there are vast fields—so we may suppose, at least—that the particular sciences have not yet appropriated. And when we are most rigidly and fundamentally scientific, we are constantly forced into these fields—or rather into this undivided and unlimited area—into science itself. And *then* we are rightly said to be thinking philosophically.

So it is that psychology is true to itself, or at least true to science (as distinct from an already defined and delimited *psychological* science) when it objects to being defined in any way which leaves out the central fact upon which it is based, namely, the consciousness of self, without which psychology surely would disappear along with—well, the universe, I should suppose. But at the same time such inquiries as keep insisting upon this basic fact may well be the beginnings of a particular new science or of various new sciences, allied, perhaps, to current psychology of the orthodox structural, or functional, or behavioristic schools. It may well be the case, on the contrary, that this connection with what is conventionally known as psychology is more remote than has so far appeared. But, at least, I should say that when self-psychology is objected to as philosophical, the real significance of the objection is rather different from the apparently condemnatory meaning of the objector.

If self-psychology is philosophical, it is because it is trying to be truly and fully scientific. The endeavor of any thinker, however, to be *purely scientific* is destined to certain failure, for what is most fundamentally scientific is *science* instead of a part of any one particular science; or if it is dwelt on long enough and is the right sort of material, namely, that which the thinker in question is able to organize, it becomes not just science, but one particular science with its own particular limited field. In other words, the attempt to be thoroughly scientific may well lead to a new special science; but

until this special science becomes defined, all speculation in the general field of thought out of which it emerges is that most fertile of all the parts of thought, *i. e.*, philosophy itself.

Philosophy is thus the concrete embodiment of science in general. *Science,* as a general term applicable to all the sciences, denotes just these various sciences; but it connotes scientific method in the very sense in which all philosophy aspires to be scientific. Historically, it would even be more appropriate to say that the modern connotation of the term *science* is expressed in the ancient term *philosophy.* Thus when modern scientists engage in science in general, or study what they call the foundations or the grammar of science, they are doing what has for centuries been called philosophizing; and whether they like it or not, they are what is regularly and traditionally called philosophers. *Science,* as a general term, has precisely that indefinitely great extension that reduces its intension to the vanishing point; and the failure of the scientist to arrive at abstract science itself is inevitable. But we are not willing to call the most fundamental and important part of our thinking a failure, and we name it philosophy. The ancient philosophers were many of them avowed scientists. Modern scientists, as they increase in breadth of view and power of thought, tend to become philosophers. And it seems to me not unreasonable to see in philosophy a name for science itself; an abstraction, to be sure, but an abstraction which the most concrete scientific facts force us into. While we remain so situated, we rightly maintain our self-respect by embodying the abstract with a name—we become philosophers.

To use a figure, we become the votaries of a god, the seekers after a divine essence, knowledge itself—an essence which never materializes except in such concrete forms as reveal, one at a time, and in endless succession, its numberless and inexhaustible aspects, but never its central self. Genuine worship of any of these aspects (any sort of scientific research) gives the worshiper an intimation of the central and original essence; but worship of the sheer essence, while it may lead inwardly to meditation or even philosophic rapture, is outwardly successful only when it discovers a new incarnation of the divinity. And such outward success is philosophical failure, for the philosopher demands the very essence itself, and all incarnations are but partial.

Perhaps the figure weakens the point. But it seems to me to define my conception of philosophy and to identify it with science in general. And while, in the nature of the case, I can not identify the central fact of self with the "divine essence" of knowledge, it seems to me not *mere* speculation to say that the self of self-psychology, instead of giving us access to a field of *un*scientific philo-

sophical speculation, rather points us to the very source of all science, which is indeed what is called philosophy, but which is no less scientific than laboratory work in electrical measurements or color perception.

On the basis of such a conception of the continuity, if not the identity, of science and philosophy I can at once hiss the transcendentalists, applaud the scientists, and yet be myself a philosopher, regarding philosophy and the philosophical method as the most valuable either of mental achievements or of intellectual occupations, and the most purely scientific. And in thus saving my own intellectual integrity I seem to myself to offer to scientists and philosophers a ground of agreement and a basis for mutual respect, without at all giving up their traditions or their convictions. Such agreement is much to be desired, for their present state of independence results in such ridiculous misunderstanding and such disrespect for each other that it is a danger to their own thinking. To despise the empirical as beneath you is like despising the earth itself, the source of life; but to despise the "philosophical" is only another way of despising that same earth; for any science is fundamentally scientific only when it is philosophical; philosophy is, after all, its only source of meaning.

D. W. PRALL

BERKELEY, CALIFORNIA.

SOCIETIES

NEW YORK BRANCH OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

THE New York Branch of the American Psychological Association met in conjunction with the Section of Anthropology and Psychology of the New York Academy of Sciences at Columbia University on November 26. The following papers were read:

Psychological Examinations of College Freshmen.—Miss EDITH CAROTHERS.

The purpose of the investigation is first, to establish norms and standards of performance in mental tests for Barnard freshmen, and second, to furnish information of aid to college authorities in solving problems of administration, and of aid to students in giving them a knowledge of their abilities and aptitudes. A series of twenty-one psychological tests was selected and tried out on a group of 100 Barnard freshmen during the year 1915–16. The tests used were: Coordination, Tapping, Cancellations, Number Checking, Color Naming, Directions, Opposites, Verb Object, Mixed Relations, Word

Building, Word Naming, Knoz Cube, Digit Span, Word Memory, Recollection and Recognition, Substitution, Trabue Completion, Information, and Vocabulary. The tests were given individually and the time required to test each freshmen was one hour.

Norms and standards of performance were found for the Barnard group in all the tests. An individual report was sent to each student who took the tests. This consisted of two blanks, giving a description and interpretation of the tests with whatever vocational significance each test possessed. A third blank indicated the standing of the individual student in each test together with the average standing in each test for the entire group of 100 freshmen.

Inter-test correlations were calculated. These were not very high. The highest correlation was between Cancellation and Word Naming (+77). There were very few minus correlations. The extent to which one test correlated with every other test was determined and Word Naming was found to be the best test according to this classification. The five tests that ranked next in excellence were: Opposites, Cancellation, Number Checking, Color Naming, and Verb Object. The results of this investigation are considered to be tentative and were reported for their suggestive value.

Distribution of Time in Learning a Foreign Vocabulary.—ROBERT A. CUMMINS.

The purpose of the experiment here reported was to compare two sorts of distribution of time in the learning of large groups of foreign words—*A*, a schedule in which the study-periods are of equal length, and *B*, a schedule in which the length of the study-period decreases progressively, with an increasing interval of time between the periods.

The subjects were five graduate students in Teachers College, two women and three men, including the author.

The material used consisted of two lists of French words of 150 words each, selected by chance from 1,200 ordinary French words.

The study was begun on October 29, 1917 and continued through November 13, the test being given on November 14.

By the plan of the experiment an equal number of study-periods, (6) spread over the same length of time (lacking but one day), was devoted to each list. The total amount of time spent (120 min.), the average length of the study-periods (20), and the total number of repetitions of the associations (24) were the same for both schedules.

The equal-schedule consisted of 6 study-periods of 20 minutes each with a two-day time-interval between, while the reducing-schedule consisted of 6 study-periods as follows: 40, 30, 20, 15, 10, and 5 minutes, with decreasing time-interval.

Uniform instructions equalizing in so far as possible all the factors save that of distribution of time were followed.

Three of the subjects did better with the Reducing schedule, two did better with the Equal schedule. The total number of words learned by the five subjects, however, was 562 for the Equal schedule and 561 for the Reducing.

In a subsequent test given one week later, the same three subjects did better with the Reducing schedule, the other two doing better with the Equal schedule. The total number of words retained by the five subjects was 538 for the Equal list and 556 for the Reducing.

When does a Baby begin to Think.—G. C. MYERS.

About twenty-five years ago H. W. Brown collected a number of notes on children from two years onward,[1] which, as Thorndike has pointed out, show children as early as two years "making inductions and deductions after the same general fashion as adults." The writer presented a few notes from his baby as follows: (The numbers indicate days.)

178—J. looked back and forth from my face and moving hand as I sharpened my razor.

352—Failing to make a sound on the piano he placed A.'s hands upon the keys.

420—Turned about to examine an obstacle over which he had stumbled.

810—Failing to reach a desired object on the table, he ran directly to a box filled with toys, emptied them, carried the box to the table, inverted it and got what he wanted. This box had never been used for that purpose.

915—To question, "What will Daddy do with you for that?" he replied, "Daddy school."

1134—"Wagon all wet; must have rained last night."

Samples of questions asked by the child at various ages follow:

1010—Who made the pond?

1024—Who put the tail on the fish?

1036—Where does milk come from? sugar? ice? meat?

1050—Why you come here for?

1121—Why that fish have a tail?

1131—Does it hurt to stick pins into the doll?

1166—Who made you?

1216—When I was a big boy where did Daddy come from?

Samples of Generalization.—In the dawn of his speech development (which was rather slow) *chická* was used to mean, chicken, chicken coop, wire netting, all kinds of fowl and birds, eggs, to gather

[1] Ped. Sem., Vol. II.

the eggs, to feed the chickens, chicken feed, pail from which the chickens were fed, any kind of pail, sounds by the chickens, cooked chicken, and all kinds of meat and fish.

Likewise common objects were classified in play (without suggestion or training):

313—Dragged one of my shoes across the floor and placed it beside a pair of his; repeated for the second shoe.

461—Punished once for throwing angular blocks he now throws only spherical things as ball, apple, and potato.

562—Picked from a set of blocks all the hemispheres and laid them side by side.

643—Put blue, red, green, and white spools on pegs of their respective colors. (A suggestion for testing early color perception.)

Since the latter part of his third year at least, all his play has been marked by purpose.

594—Showed pretty certain evidence to mean that one of several pencils was shorter than the rest.

930—Looking from one to another of several like faucets said "same."

1281—"This rocking-chair same as victrola, only it has no door."

2—Always ceased crying when placed in his mother's arms, in which position he received food. Not so when in others' arms.

331—Laughed aloud and clapped his hands when mother brought his coat.

Contrary to Sully, Perez, King and others, such reactions do not presuppose images necessarily; rather they indicate *short-cut associations* or, what some may perfer to call *conditioned reflexes.* Doubtless all reasoning is explicable in these terms.

Elemental reasoning is present at birth, if not at some time before. Gradually by the second or third year the more complex type of reasoning, common to adults, but hardly common to the lower animals, has evolved.

A New Clinical Test for Temperature Sensitivity.—E. L. CORNELL.

This paper was a report of an experiment intended to standardize a test of the reaction-time to cold and hot stimuli simultaneously applied—a test which, it is hoped, will prove of diagnostic value in some types of sensory dissociation. Five normal individuals were carefully examined upon forty areas of the skin surface, in regard both to the double, simultaneous stimulation, and to separate hot and cold stimuli. It was found that a majority of the responses to the double stimulation elicted first cold, then hot; although the reaction for the two sorts of stimuli separately showed no clear time-difference. The proportion of responses occurring in the order "Cold-Hot"

varied considerably among the different subjects and according to the area tested—the abdomen and back having the largest number and the hands and arms the least. The reaction-time for cold, measured graphically by the experimenter, was about 1.0 second; hot followed about .4 sec. later, except on the feet and legs where the median interval was .8 and .6 sec., respectively.

Psychological Tests upon an Expert Marksman.—A. I. GATES.

The world's champion marksman at 200 yards off-hand shooting with 100 consecutive shots, and 10 university students as a control group served as the subjects for this experiment. In tests for visual acuity, control of eye movements, *etc.*, the expert showed no superiority over the students. In tests of steadiness of gross muscular control, the expert was markedly superior. In all such tests he was less subject to suggestion and distraction. In tests of steadiness and precision of movement the expert was but slightly superior to the average of the students; in the speed of movement he possessed but average ability. Tests with a device constructed for the purpose showed that the expert possessed greater control of his trigger finger. The most significant differences appeared in specially arranged tests in which the Hipp chronoscope was used to measure the reaction of pulling the trigger. The stimulus for the reaction consisted of the coincidence of two pieces of white metal, one piece being stationary and approached by the other sometimes in a uniform and sometimes in an irregular manner. This approximated the wavering of the sight of a gun about the target. In these tests the expert in no case made premature reactions, while the 10 students average about 6 premature reactions out of 50; the expert was not markedly superior in *speed* of reaction, but decidedly so in the *uniformity* of his reactions. The uniformity and precision of coordination of eye and hand afforded a basis upon which habits of accurate shooting could be established.

A. T. POFFENBERGER,
Secretary.

COLUMBIA UNIVERSITY.

REVIEWS AND ABSTRACTS OF LITERATURE

A Scale of Performance Tests. RUDOLF PINTNER and DONALD G. PATERSON. New York: D. Appleton and Company. 1917. Pp. 218.

In reducing to a commensurable series a number of test methods independent of language, the authors have done service that their colleagues in mental measurement will not estimate lightly. Grow-

ing out of work with deaf children, it readily extends itself to language difficulties of all kinds. The tests in the scale are fifteen in number, as follows:

1. Mare and foal (Healy, omitting geometrical forms).
2. Seguin Form Board (after Goddard and Twitmeyer).
3. Five-Figure Board (Paterson).
4. Two-Figure Board (Pintner).
5. Casuist Form Board (Knox).
6. Triangle Test (Gwyn).
7. Diagonal Test (Kempf).
8. Construction Puzzle A (Healy).
9. Manikin Test (Pintner).
10. Feature Profile Test (Knox, Kempf).
11. Ship Test (Glueck).
12. Picture Completion Test (Healy).
13. Substitution Test (Woodworth and Wells).
14. Adaptation Board (Goddard).
15. Cube Test (Knox, Pintner).

Governing factors in this series were (1) selection of tests seeming to call for "different types" of response, (2) presentation of relatively new situations, (3) elimination of verbal instructions for the tests. If verbal instructions are used with the normal child, it is simply because it would be unnatural not to do so; their omission does not change the essential character of the test. Detailed account of each test is given, and another printing might well complete its intelligibility to the beginner by illustrating the Goddard Adaptation and the Seguin Boards. It is noticeable that the tests are largely of the form-board type. A time limit of 5 minutes per test is generally assigned; perhaps D. N. C. would be advantageously replaced by some simpler convention for "did not complete."

There follow discussions of the factor of social status, and of the numbers necessary for norms. Graphs are presented showing relatively slight changes induced by adding further cases after certain limits are reached. Three types of standardization are distinguished; the simple determination of norms, their classification in an age scale, and their distribution by the percentile method.

The standardizing work of the authors is first presented in tables giving the complete distribution of scores, and by graphs which indicate the median and the 25 and 75 percentiles. Later tables give the ten percentile distributions at each age for all the tests. A suggestion is thrown out for using as the criterion of mental age the simply obtained median of mental ages in the various tests. Determining it shows the "scattering" of the subject.

Critical attention is given to scoring policies, and the work nowhere appears to better advantage than in the chapters on the Year Scale, the Point Scale, and the Percentile Method. The authors have in mind a similar goal to that set by Yerkes, a series of tests based upon the concept of developing functions having commensurable values through more or less of the whole developmental period. That performance in a test is regarded as distinctive for a certain age, which is reached by 75 per cent. of the individuals at that age. As tests of the present type show many degrees in quality of performance, it is possible to use most of the tests at many different ages. As is illustrated, suppose that the 25 percentile in a test at age seven is 31 and at the age eight it is 18. This means that at age seven the upper 75 per cent. make scores better than 31; therefore, 30 is taken as one limit and this limit extends down to the limit of age eight. All those with scores between 30 and 18 have seven-year credit, since 75 per cent. of seven-year olds make scores better than 31; but if they score better than 18 they receive eight-year credit.

In adapting the standardization to a point scale, three principles of allotting points are discussed. One may observe the number of breaks in the age curve of a test, and assign as many points as there are such breaks. The objection is raised that this does not apportion the amount of credit to the difficulty of the test. One may allot an equal number of points to each test; for example, if 20 points are allotted to each test, and a test shows five progressive types of performance, 4 points for each type is credited. The poorest type of performance scores 4 points, the next 8, *etc.* The most approved suggestion is giving to each type of performance a credit proportional to the chronological age for which the performance is distinctive. Thus, "since average five-year-olds can do two moves on the adaptation board, we must give a score of 5 to two moves on this board; for four moves on the board we must give a score of 6, since four moves is the average performance of six-year-olds."

The work is calculated to bring out great advantages in the relative position method of scoring, of which the authors are fully aware. In dealing with children these advantages have been obscured by the convenience and immediate significance of age norms, though the method is patently indispensable where development with age has ceased to be a governing factor. The comparative steps here used are ten-percentiles, which give a practically sufficient picture of the distributions. The child's ability can be expressed as that of a 10, 20, 60, or 80 percentile child of his own age. "Constant use of the percentile method would soon lead us to attach very definite meanings to such terms."

A point of detail, but a good one, is the correction of a time score for errors by adding to it a percentage of itself based on the number of items in the test. In a fifty-item test, for example, "each error is counted 1/50 of the total time for the test." So small a proportion, indeed, barely penalizes the errors at all. The weight to be given errors must vary with different kinds of experiments, but three times the requirement for an item of correct response would seem a minimum.

The value of the work is independent of any particular concept of intelligence, but some comment on this will not be out of place if the authors are correct in quoting as "generally accepted" Stern's definition of intelligence as "the general capacity of an individual consciously to adjust his thinking to new requirements; general mental adaptability to new problems and conditions of life." The first half of this definition is unexceptionable, but the second is hardly consistent therewith. The intelligence scales fit the first part but too well to fit the second, it being notorious that complete failure of social adaptation is possible in the presence of normal or even supernormal *IQ*. It is Mr. Facing-both-ways who formulates a definition of intelligence in terms of what can be measured experimentally, and then interprets that intelligence as equivalent to the whole personality. Intelligence being conceived as that factor in human adaptations which is governed by cognitive and conscious elements, we have in the scales a measurement of intelligence in its purest form. They tell us not what the subject is, but they do tell us what he knows. And through analyzing this intelligence as it is not analyzed by actual life, they perform what is, indeed, the primary function of scientific experiment. They analyze one factor in the personality which in ordinary life is combined inextricably with emotional, volitional, unconscious factors. Says the *IQ* to the imbecile, "You are old enough to know better;" and to the psychopath, "You know better than to act the ten-year-old."

F. L. WELLS.

McLEAN HOSPITAL,
WAVERLEY, MASS.

Philosophy and the Social Problem. WILL DURANT. New York: The Macmillan Company. 1917. Pp. x + 272.

This book, written in a popular style, is an earnest plea for the utilization of philosophy in the solution of "the problem of reducing human misery by modifying social institutions." This, the social problem, has been the basic concern of many of the greater philosophers (p. 1). It can only be solved with the assistance of men with the philosophical point of view, who interpret experience as a

whole, and can, therefore, effect a coordination which specialized scientists could not achieve alone (pp. 222, ff.). In performing this service philosophy, which needs more contacts in "the hard and happy world of efforts and events," will be quickened into fresh life (pp. 264–267).

The first half of the volume is devoted to an interesting discussion of several philosophers whose thoughts are significant for the social problem. From Socrates our author adopts the principle that empasis must be placed upon intelligence; from Plato, that this intelligence must be employed by philosophical experts for the common good; from Bacon, that this intelligence is to be the product of scientific investigations; from Spinoza, that the avenue of this development of intelligence must be democratic. Just what principle he means to adapt from Nietzsche, to whom he devotes an interesting and appreciative exposition, and whom he apparently ranks above all other modern philosophers except Spinoza (p. 180, *cf.* p. 116) is not clear to me.

The author offers a practical suggestion that is not unworthy of serious consideration. He proposes that a "Society of Social Research" be organized, to consist of men eminent in philosophy and the various social sciences. Under the auspices of this society investigations into social maters would be made, for the purpose of ascertaining the precise facts upon matters of popular political controversy. The results of these investigations would be given to the world in untechnical language, and in time would come to have weight with the general public. Society in the future could in this manner remain democratic in its constitution, and yet benefit by expert information and advice.

The essay is well written, and should help to make the social value of philosophy better appreciated. It is obviously not meant to be exhaustive, and doubtless the author will be satisfied if his readers are led to seek further acquaintance with the philosophers whom he discusses, as well as with others, equally important, of whom the limits of his work did not admit of treatment.

WILLIAM KELLEY WRIGHT.

DARTMOUTH COLLEGE.

JOURNALS AND NEW BOOKS

REVUE PHILOSOPHIQUE, August, 1917. *Les attitudes mentales et la mémoire* (first article) (pp. 105–151): A. LECLÈRE. – A study of the importance of the notion of mental attitude for the psychology of memory. *Conditions et limites du bonheur* (pp. 152–170): G. BAUCHAL. – The ideas of virtue, religion, *etc.*, are of an-

other order than that of happiness. Happiness consists of certain experiences, of which the chief, in the order of decreasing intensity, are the emotions, the sensations, sentiments, and finally others without distinguishing name. Our experiences, at a given moment, have a common measure. *Notes et Documents. La valeur de l'espèce dans la Biologie contemporaine:* ÉTIENNE RABAUD. – Species denotes "a morphological ensemble, having the value only of a conventional label, whose relative value must be determined in each particular case." *Analyses et Comptes rendus.* Clodius Piat, *Leibniz:* LIONEL DAURIAC. Enzo Bonaventura, *Le qualita del mondo fisico:* FR. P. Marie Grzegorzewska, *Essai sur le développement du sentiment esthétique:* CHARLES LALO. Pierre Bovet, *L'Instinct combatif:* E. CRAMAUSSEL.

REVUE DE METAPHYSIQUE ET DE MORALE. September, 1917. *Pour le progrés de la métaphysique* (pp. 489–516) : CH. DUNAN. – Philosophy is nearer to life than science, for its aim is to systematize, that is, to organize, which is life itself. *L'individualisme de la Révolution Française et du Code Civil et la structure nouvelle de la vie économique* (pp. 517–568) : G. MORIN. – "The living law of economic relations removes us progressively from individualist orthodoxy." We are no longer concerned with the individual, but with individuals; not with the group, but with groups; not with the Nation, but with Nations. *De la Nécessité d'une réforme dans l'enseignement de la logique* (pp. 569–594) : L. ROUGIER. – An examination of the definitions and divisions of formal logic in the light of the discoveries of the logisticians. *Enseignement. Pour un enseignement philosophique nouveau:* E. CRAMAUSSEL. *Questions pratiques. Réflexions sur la guerre expiatrice:* R.H.

Williams, Mabel Clare. Description of an Unusual Case of Partial Color Blindness; Stewart, G. W., Binaural Beats; Seashore, C. E., and Mount, George H., Correlation of Factors in Musical Talent and Training; Malmberg, C. F., The Perception of Consonance and Dissonance; Gaw, Esther Allen, A Revision of the Consonance Test; Seashore, C. E., and Ling, T. L., The Comparative Sensitiveness of Blind and Seeing Persons; Seashore, C. E., and Tan, Kwei, The Elemental Character of Sensory Discrimination. University of Iowa Studies in Psychology, Vol. XXV, No. 2. Princeton, N. J.: Psychological Review Company. 1918. Pp. 163.

NOTES AND NEWS

A MEETING of the Aristotelian Society was held on December 17, 1917, Dr. H. Wildon Carr, President, in the chair. A paper was read by Dr. G. E. Moore on "The Conception of Reality." Bradley asserts both (*i*) "Time is not real" and (*ii*) "Time exists, is a fact, and is"; and he evidently thinks that these two assertions are compatible. In truth, however, (*i*) ought to include, as part of its meaning, "There are no temporal facts," while (*ii*) ought to include, as part of its meaning, "There are some temporal facts"; so that the two assertions are not compatible. It is suggested that the reason why Bradley supposes them to be compatible is because he sees (*a*), what is true, that "Temporal facts are unreal" is compatible with "We think of temporal facts," and supposes also (*b*) what is false, that "There are no temporal facts" is incompatible with "We think of temporal facts." If (*a*) and (*b*) are both true, it would follow that "Temporal facts are unreal" could not include as part of its meaning "There are no temporal facts"; and that hence (*i*) must be compatible with "There are some temporal facts." In truth, however, there is no difficulty in supposing that (*b*) is false.

THE New York Branch of the American Psychological Association met in conjunction with the Section of Anthropology and Psychology of the New York Academy of Sciences on Monday, February 25. The following papers were presented: "The Influence of Practise on Correlation of Abilities," Miss Georgina Stickland; "A Tentative Formulation of a Psychology of Play," Miss Clara F. Chassel; "Families of American Men of Science," Mr. Dean R. Brimhall; "A Note on a Mathematical Prodigy," Dr. Lorle I. Stecher; "Redintegrative Mechanisms in the Psychoneuroses," Professor H. L. Hollingworth.

AT Swarthmore College the work in psychology and education formerly conducted by Professor Bird T. Baldwin will be carried on jointly by Professor Charles Fisher, of the department of education, West Chester State Normal School, and Professor S. B. Davis, of the department of education of Ursinus College.

DR. JOSIAH MORSE, professor of philosophy and sociology at the University of South Carolina, has been granted leave of absence for the duration of the war to become director of the Red Cross work in South Carolina and field director of the work at Camp Jackson.

A COURSE of five lectures by Dr. George LaPiana, of Harvard University, on "The History of Moral Theology in the Catholic Church" was completed at the Union Theological Seminary in January.

The Journal of Philosophy
Psychology and Scientific Methods

There is no similar journal in the field of scientific philosophy. It is issued fortnightly and permits the quick publication of short contributions, prompt reviews, and timely discussions. The contents of the last five issues are as follows:

Volume XIV. No. 26. December 20, 1917

The Pragmatic Theory of Value: A Reply to Herbert W. Schneider. WILBUR M. URBAN.
The Values of Pragmatic Theory: Rejoinder to Professor Urban. HERBERT W. SCHNEIDER.
Reviews and Abstracts of Literature. Journals and New Books. Notes and News. Index.

Volume XV. No. 1. January 3, 1918

Fate and Free Will. C. A. STRONG.
The Philosophy of Loyalty. A. K. ROGERS.
Reviews and Abstracts of Literature. Journals and New Books. Notes and News.

Volume XV. No. 2. January 17, 1918

Concerning Alleged Immediate Knowledge of Mind. JOHN DEWEY.
The Epistemological Significance of Social Psychology. C. E. AYRES.
The Proof-Reader's Illusion and General Intelligence. JUNE E. DOWNEY.
Reviews and Abstracts of Literature. Journals and New Books. Notes and News.

Volume XV. No. 3. January 31, 1918

Hypotheses and Instrumental Logicians. H. T. COSTELLO.
Vox Populi, Vox Dei. G. A. TAWNEY.
Some Remarks on "Two Common Fallacies in the Logic of Religion." EDGAR S. BRIGHTMAN.
The Validity of Religious Belief. JARED S. MOORE.
Reviews and Abstracts of Literature. Journals and New Books. Notes and News.

Volume XV. No. 4. February 14, 1918

Value and Causality. WENDELL T. BUSH.
Societies: The Twenty-Sixth Annual Meeting of the American Psychological Association. ARTHUR I. GATES.
Reviews and Abstracts of Literature. Journals and New Books. Notes and News.

THE JOURNAL OF PHILOSOPHY

PSYCHOLOGY AND SCIENTIFIC METHODS

Sub-Station 84, New York City

$3.00 per annum (26 numbers) **15 cents per copy**

Directory of American Psychological Periodicals

American Journal of Psychology—Worcester, Mass.; Florence Chandler.
Subscription $5. 600 pages annually. Edited by G. Stanley Hall.
Quarterly. General and experimental psychology. Founded 1887.

Pedagogical Seminary—Worcester, Mass.: Florence Chandler.
Subscription $5. 575 pages annually. Edited by G. Stanley Hall.
Quarterly. Pedagogy and educational psychology. Founded 1891.

Psychological Review—Princeton, N. J.: Psychological Review Company.
Subscription (with Psychological Bulletin) $6. 480 pages annually.
Bi-monthly. General. Founded 1894. Edited by Howard C. Warren.

Psychological Bulletin—Princeton, N. J.: Psychological Review Company.
Subscription $3.25. 480 pages annually. Psychological literature.
Monthly. Founded 1904. Edited by Shepherd I. Franz.

Psychological Monographs—Princeton, N. J.: Psychological Review Company.
Subscription $4 per vol. 500 pp. Founded 1895. Ed. by James R. Angell.
Published without fixed dates, each issue one or more researches.

Psychological Index—Princeton, N. J.: Psychological Review Company.
Subscription $1.25. 200 pp. Founded 1895. Edited by Madison Bentley.
An annual bibliography of psychological literature.

Journal of Philosophy, Psychology, and Scientific Methods—New York.
Sub-Station 84. Bi-weekly. 728 pages per volume. Founded 1904.
Subscription $3. Edited by F. J. E. Woodbridge and Wendell T. Bush.

Archives of Psychology—Sub-station 84, N. Y.: Archives of Psychology.
Subscription $5. 600 pp. ann. Founded 1906. Ed. by R. S. Woodworth.
Published without fixed dates, each number a single experimental study.

Journal of Abnormal Psychology—Boston: Richard G. Badger.
Subscription $4. 480 pages annually. Edited by Morton Prince.
Bi-monthly. Founded 1906. Entire field of abnormal psychology.

Psychological Clinic—Philadelphia: Psychological Clinic Press.
Subscription $1.50. 280 pages annually. Edited by Lightner Witmer.
Monthly (9 numbers). Orthogenics, psychology, hygiene. Founded 1907.

Training School Bulletin—Vineland, N. J.: The Training School.
Subscription $1. 160 pp. ann. Ed. by E. R. Johnstone. Founded 1904.
Monthly (10 numbers). Psychology and training of defectives.

Journal of Religious Psychology—Worcester, Mass.: Louis N. Wilson.
Subscription $3. 480 pages per vol. Founded 1904. Ed. by G. Stanley Hall
Published without fixed dates. 4 numbers constitute a volume.

Journal of Race Development—Worcester, Mass.: Louis N. Wilson.
Subscription $2. 460 pages annually. Founded 1910.
Quarterly. Edited by George H. Blakeslee and G. Stanley Hall.

Journal of Educational Psychology—Baltimore: Warwick & York.
Subscription $3. 600 pages annually. Founded 1910.
Monthly (10 numbers). Managing Editor, J. Carleton Bell.
(Educational Psychology Monographs. Edited by Guy M. Whipple.
Published separately at varying prices. Same publishers.)

Journal of Animal Behavior—Cambridge, Mass.: Emerson Hall.
Subscription $5. 450 pp. annually. Founded 1911.
Bi-monthly. Robert M. Yerkes, Managing Editor.

The Behavior Monographs—Cambridge, Mass.: Emerson Hall.
Subscription $5. 450 pages per volume. Edited by John B. Watson.
Published without fixed dates, each number a single research.

Psychoanalytic Review—Washington, D. C.: 3617 10th St., N. W.
Subscription $5. 500 pages annually. Psychoanalysis.
Quarterly. Founded 1913. Ed. by W. A. White and S. E. Jelliffe.

Journal of Experimental Psychology—Princeton, N. J.
Psychological Review Company. 480 pages annually. Experimental.
Subscription $3.25. Founded 1916. Bi-monthly. Ed. by John B. Watson.

Journal of Applied Psychology—Worcester, Mass.: Florence Chandler.
Subscription $4. 400 pages annually. Quarterly. Founded 1917.
Edited by G. Stanley Hall, John Wallace Baird and L. R. Geissler.

Journal of Experimental Psychology—Princeton, N. J.
Psychological Review Company. 480 pages annually. Experimental.
Founded 1915. Subscription $3. Bi-monthly. Edited by John B. Watson.